

NOTES ON *PROTEA* IN SOUTH AFRICA: THE *PROTEA TENAX* TANGLE

J. P. ROURKE

(Compton Herbarium, Kirstenbosch)

ABSTRACT

The correct usage of the name *Protea tenax* (Salisb.) R. Br. is indicated and the variability of this species is discussed. The taxon previously referred to as (*P. tenax* (Salisb.) R.Br. var. *latifolia* Meisn.), is accorded specific rank and redescribed as *P. foliosa* Rourke.

UITTREKSEL

AANTEKENINGE OOR *PROTEA* IN SUID-AFRIKA: DIE *PROTEA TENAX* VERWARRING

Die korrekte gebruik van die naam *Protea tenax* (Salisb.) R.Br. word aangedui en die veranderlikheid van die soort bespreek. Die takson voorheen bekend as *P. tenax* (Salisb.) R. Br. var. *latifolia* Meisn., word verhef tot 'n soort en herbeskryf as *P. foliosa* Rourke.

INTRODUCTION

Protea tenax (Salisb.) R.Br. as construed by Phillips and Stapf (1912), contained two elements: a decumbent narrow leaved form and an erect, shrubby broad leaved form, the latter being referred to as *Protea tenax* (Salisb.) R.Br. var. *latifolia* Meisn. Due to the citation of only one specimen of the decumbent narrow leaved form and the citation of numerous collections of the erect, broad leaved form in their account of *Protea tenax* in the *Flora Capensis*, the name *P. tenax* came to be associated with the erect, broad leaved form in most herbaria. The position was not improved by the erroneous citation of a Niven collection of the decumbent narrow leaved form of *P. tenax* under *Protea canaliculata* Andr. resulting in the association of the name *P. canaliculata* with material that should have been referred to *P. tenax*.

A careful study of the type material of all the names involved as well as several years of field work, have now clarified the position. This note is an attempt to clear up the confusion of the past and to define the taxa in question, preparatory to publishing a revision of *Protea* in South Africa.

DISCUSSION

Field studies revealed that two series of allopatric populations are involved which can easily be distinguished by differences in growth habit.

1. From van Stadensberg eastwards to Grahamstown, a relatively uniform taxon occurs, having a shrubby growth habit with erect, usually unbranched

stems to 1,5 m in height, very prominent, lanceolate, oblanceolate or elliptic leaves and small globose inflorescences. In most herbaria, material of this taxon has been named *P. tenax* (Salisb.) R.Br. but a comparison with the type illustration (*Paradisus Londinensis* tab. 70), clearly shows that it is not *P. tenax*. Although recognized as different and described by Meisner as *P. tenax* (Salisb.) R.Br. var. *latifolia* Meisn. this taxon must be accorded specific rank on the basis of its distinct morphology and geographical isolation. However, it is not possible to raise Meisner's epithet to specific rank since this step would involve the creation of a homonym. It is therefore described *de novo* as *Protea foliosa*.

***Protea foliosa* Rourke, sp. nov.**

A species cognatae differt, propter habitu erecto fruticoso, caulibus erectis non ramosis, foliis prominentibus glabris, lanceolatis vel late ellipticis, inflorescentias cingentes.

Frutex parvus, rotundatus, 1,5 m altus, caulibus numerosi rectus, caudicibus exorientes. *Caules* recti, non ramosi (tantum raro ramosi), glabri, 6–8 mm in diam. *Folia* lanceolata, oblanceolata vel late elliptica, 9–16 cm longa, 1,5–7 cm lata, obtusa vel acuta; glabra, sed pubescentia initio. *Inflorescentiae* ovoideae vel globosae, cyathiformes, 3–4 cm in diam., reconditae, foliis amplis superantibus. *Receptaculum involucale* 1,5 cm in diam., late convexum. *Bractee involucales* 4–5 seriatae. Series intima oblonga spathulata, 3–3,5 cm longa, 1 cm lata, apices rotundatos concavos. Series externa ovata vel late ovata, obtusa, 0,7–1,5 cm longa, 0,7–1,2 cm lata; pagina externa sparsa sericea, glabrescens, viridiflava, sordida-carmina suffusa. *Perianthium* 2,5–3 cm longum, glabrum, praeter perianthium limbum manifeste lanatum ad apicem. Perianthium limbi lineares, acuminati, glabri sed apices dense lanatos. *Stylus* 2,5 cm longus, arcuatus adaxialis, contractus terminalis. *Stigma* peranguste lineare, 5 mm longum, compressum, longistrorsum sulcatum. *Squamulae* hypogynae ovatae, acutae, 1,5 mm longae.

A rounded shrub to 1,5 m tall with numerous straight, erect stems arising from a woody subterranean rootstock. *Stems* stout, 6–8 mm in diam., erect, glabrous, rarely branched. *Leaves* lanceolate, oblanceolate or broadly elliptic, 9–16 cm long, 1,5–7 cm broad, narrowed in the petiolar region; apex acute to obtuse; margins occasionally undulate; coriaceous, surface minutely granulate, pubescent at first, soon glabrous. *Inflorescences* ovoid to globose, cyathiform, 3–4 cm wide hidden by large overtopping leaves; terminal but occasionally axillary. *Involucral receptacle* broadly convex, 1,5 cm in diam. *Involucral bracts* 4–5 seriate; innermost series oblong-spathulate 3–3,5 cm long, 1 cm wide, apex broadly obtuse, concave; outer series ovate to broadly ovate, obtuse, 0,7–1,5 cm long, 0,7–1,2 cm wide; outer surface minutely fimbriate; usually greenish yellow, occasionally flushed with dull carmine, particularly along margins. *Perianth*



FIG. 1.

Protea foliosa Rourke, part of the type material, Rourke 1410. Above: flowering shoot, $\times 0,5$.
Below: inflorescence at anthesis, life size.

straight to very slightly adaxially arcuate, 2.5–3 cm long; tube 8–10 mm long, glabrous; claws slender with strongly undulate margins, glabrous; limbs 8–10 mm long, linear, apices acuminate, glabrescent to glabrous for greater part of their length but apex thickly lanate with a white or brown indumentum. *Style* 2.5 cm long, straight to slightly adaxially curved. *Pollen presenter* linear, acute, 5 mm long. *Ovary* obovoid, 3–4 mm long covered with long tawny trichomes. *Hypogynous scales* ovate acute, 1.5 mm long.

Protea magnifolia Buek in Drège, Zwei Pfl. Doc.: 118; 127; 213 (1843)—nom. nud.

Protea caulescens E. Mey. ex Meisn. in DC., Prodr. 14: 244 (1856)—nom. nud.

Protea tenax (Salisb.) R.Br. var. *latifolia* Meisn. in DC., Prodr. 14: 244 (1856); Phill. & Stapf in Fl. Cap. 5: 587 (1912). Type: Circa Galgebosch et van Stadensberg, Drège *s.n.* in herb. Meisn. (NY, holo.!).

Two manuscript names, *P. magnifolia* and *P. caulescens* have been applied to this species but both are *nomina nuda*. The varietal epithet, *P. tenax* (Salisb.) R.Br. var. *latifolia* Meisn. cannot be raised to specific rank as it would then become a homonym of *P. latifolia* R.Br. Since there is no legitimate specific epithet available for this species, it is here described *de novo*.

Type Material: Van Stadensberg Forest Reserve, between Loerie and Otterford, 18.6.1974, J. P. Rourke 1410 (NBG holo.; PRE, STE, BOL, GRA, K, MO, S, M, C, iso.).

Diagnostic Characters: *P. foliosa* may be distinguished from related species on account of its shrubby, upright growth habit with erect, unbranched (or only very rarely branched) stems, and prominent glabrous leaves, lanceolate to broadly elliptic, which completely surround the small globose inflorescences.

Common in the Van Stadensberg mountains generally at elevations above 150 m, this species is also found on most Table Mountain Sandstone outcroppings around Uitenhage and Port Elizabeth. Other populations also occur in the fynbos on the hills around Riebeeck East and Grahamstown at elevations of up to 600 m, on soils derived from Witteberg Quartzite. The distribution range of *P. foliosa* falls within a region experiencing a mean annual rainfall of about 500–750 mm, distributed more or less evenly throughout the year but with a slight winter maximum. Flowering takes place erratically between March and September with the peak of the season being in May and June. However, odd inflorescences may be produced at almost any time of the year. A massive woody rootstock or lignotuber gives *P. foliosa* a high degree of fire resistance.

SPECIMENS EXAMINED

CAPE PROVINCE—3324 (Steytlerville): Assagaybosch (-CD), May, Zeyher 3667 (SAM, GRA).

— 3325 (Port Elizabeth): Mountains N.W. of Uitenhage (-CB), Aug., *Loots s.n.* (NBG 19425); Van Stadensberg and Galgenbosch (-CC), 27.12.1829, *Drège s.n.* (P, SAM); Van Stadens, 6.5.1934, *Long 1272* (PRE, GRA, RU, K); Van Stadensberg forest reserve between Loerie and Otterford, 18.6.1974, *Rourke 1410* (NBG, PRE, STE, GRA, K, M, MO, S, BOL, C); Van Stadensberg, Oct.–Nov., *Zeyher 388* (SAM, PRE); Van Stadensberg next to Galgebosch, 14.2.1814, *Burchell 4755* (K); 25 km up the Elands River road (-CD), 3.8.1960, *Acocks 21265* (NBG, PRE); Kamehs, Uitenhage, May, *Paterson 142* (BOL, GRA); 10 km west of Port Elizabeth (-DC), May, *Crump s.n.* (NBG 82, 485); Bethelsdorp, near Port Elizabeth July, *L. Bolus s.n.* (NBG 82486); Bethelsdorp Kloof, Aug., *Fries, Norlindh & Weimark 240* (S, NBG).

— 3326 (Grahamstown): Rocky mountains, Zwartbergen, Albany (-AA), *Burchell 3436* (K); Between Riebeeck East and Grahamstown (-AB), July 1813, *Burchell 3508* (K); Near Coldstream, Grahamstown (-BC), June, *Pym 1174* (SAM, GRA); Prope Grahamstown, *Mac Owan 1266* (BOL); Bottom of Signal

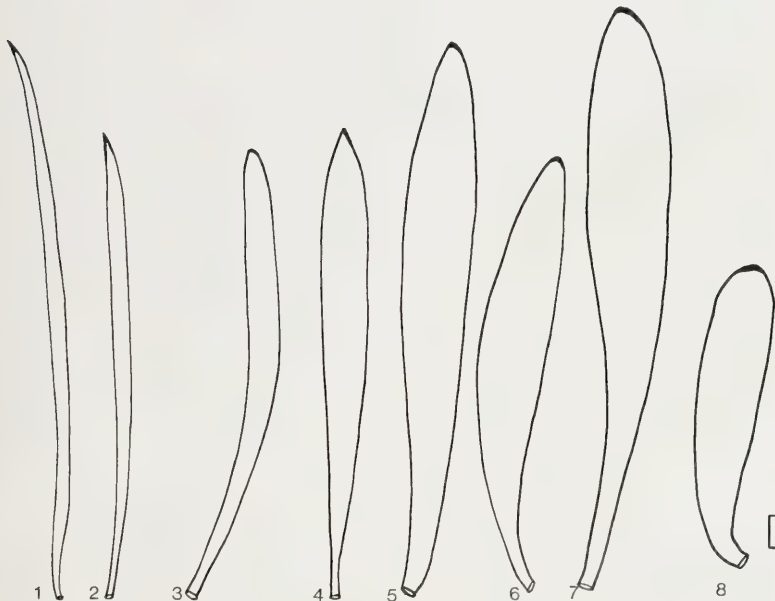


FIG. 2.

Protea tenax (Salisb.) R.Br., showing variation in the leaf morphology.

- (1) *Rourke 908*; (2) *Williams 1782*; (3) *Wurts 2081*; (4) *Rycroft 2336*; (5) *Oliver 4539*; (6) *Taylor 936*; (7) *Rycroft 2336*; (8) *L. Abel s.n.* (NBG 62889). The scale line represents 1 cm.

Hill, Grahamstown, Aug., *Daly & Sole* 473 (GRA, K); Grassy mountains, Grahamstown, *Galpin* 26 (GRA); Featherstone Kloof, north side Grahamstown, 13.6.1963, *Noel* 433 (RU); Beggars Bush, *P. Coetzee s.n.* (GRA 1173); Mountain drive Grahamstown, Aug. 1926, *L. L. Britten* 5424 (PRE); Paynes farm, Bushmans River Poort, Alexandria (-CB); 31.8.1954, *Archibald* 5624 (PRE, K).

2. The second series of populations ranges throughout the entire length of the Longkloof on the north slopes of the Outeniqua mountains, from Waboomskraal in the west to Humansdorp in the east and also occurs in the Baviaanskloof and Winterhoek mountains. All are characterised by having decumbent, trailing stems, often with secund or subsecund leaves and greenish-white, shallowly crateriform inflorescences, occasionally flushed with pink. On close examination, little variation in the dimensions or morphology of the inflorescences and floral parts is observable but marked differences in foliar characters give each population a distinctive facies. Considering the variety of habitats occupied, this variation is not surprising. Habitats vary from arid fynbos on hot north facing slopes where the mean annual rainfall is ± 300 mm, to fairly dense sclerophyll in moist sheltered localities where the mean annual rainfall is ± 770 mm.

Leaf width is the only significant variable within this series of populations. Populations occupying drier habitats tend to have narrow, linear, slightly glaucous leaves while populations with broader, elliptic or oblanceolate leaves, having little or no glaucousness, are found on moister sites. However, no satisfactory correlation between geographical distribution and leaf dimensions can be found. In general, the narrow leaved populations display very little range in leaf width but in the broader leaved populations the range in leaf width, even on a single flowering shoot, is considerable (Fig. 3). At first sight, the narrow leaved forms do appear to constitute a distinct group but their random occurrence among broader leaved populations as well as the continuous variation in leaf width (Figs. 2 & 3) makes the recognition of two taxa unwise, even at subspecific rank. *Protea tenax* (Salisb.) R.Br., the earliest legitimate epithet available for this species is typified by a fine colour plate depicting a specimen which most closely resembles a population growing in the vicinity of Kareedouw, eastern Longkloof.

Protea tenax (Salisb.) R.Br. in Trans. Linn. Soc. Lond. **10**: 88 (1810); Meisn. in DC., Prodr. **14**: 244 (1856); Phill. & Stapf in Fl. Cap. **5**: 587 (1912).

Erodendrum tenax Salisb., Parad. Lond. t. 70 (1807). Type: Plate 70 in Parad. Lond.

Protea longifolia Salisb., Parad. Lond. t. 37 (1806), non *P. longifolia* Andr. (1801). Type: Plate 37 in Parad. Lond.

Erodendrum longifolium (Salisb.) Salisb. ex Knight, Cult. Prot.: 46 (1809).

Erodendrum foetidum Salisb. ex Knight in Knight, Cult. Prot.: 46 (1809)—nom. superfl. Type: As for *Erodendrum tenax* Salisb.

Protea canaliculata sensu R.Br. in Trans. Linn. Soc. Lond. **10**: 88 (1810); sensu Meisn. in DC., Prodr. **14**: 241 (1856); et sensu Phill. & Stapf in Fl. Cap. **5**: 591 (1912)—all according to specimens cited,—non *P. canaliculata* Andr.

Protea undulata Phill. in Kew Bull **1910**: 233 (1910). Type: Without collector or locality (K, holo.!).

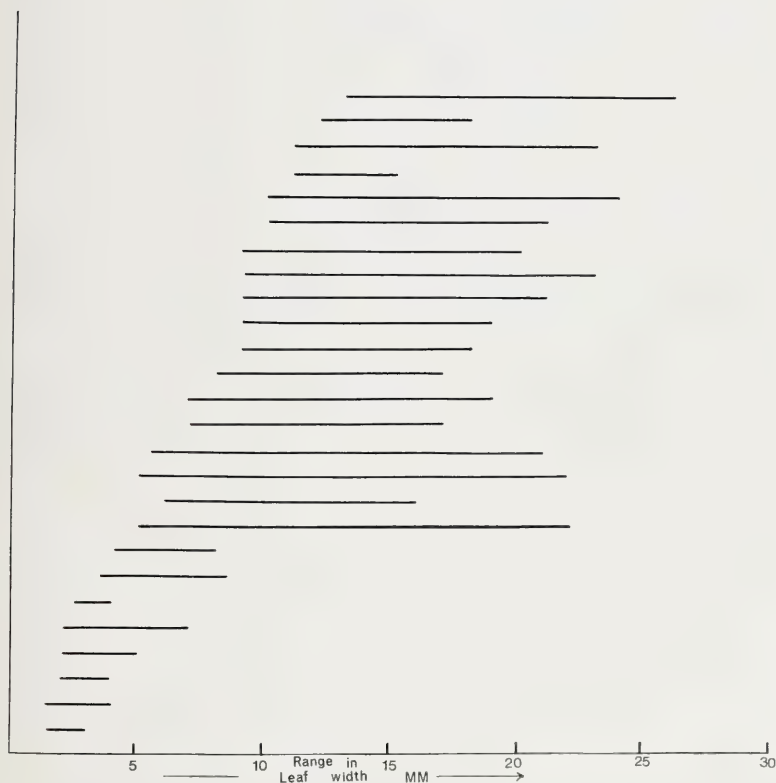


FIG. 3.

Continuous variation in the leaf width of *Protea tenax* (Salisb.) R.Br. (from 26 herbarium collections). Each horizontal stroke represents a single collection, showing the range in leaf width in that collection. This range is plotted by taking the widths of the broadest and narrowest leaves of each collection and linking these two points with a horizontal stroke.

Protea acaulos (L.) Reich. var. *cockscombensis* Archibald in Flower. Pl. Afr. **28** t. 1115 (1951). Type: The Cockscomb, Winterhoek mts., Archibald 3435 (PRE, holo. !; NBG, GRA, iso. !)

A low decumbent shrub with trailing, sparsely branched stems arising from a woody rootstock. *Stems* to 2 m in length, usually trailing, occasionally suberect, 3–6 mm in diam., puberulous at first, soon quite glabrous, usually flushed with carmine. *Leaves* linear, narrowly lanceolate to lanceolate, elliptic or oblanceolate, 8–18 cm long 2–28 mm wide, apices acute to obtuse; slightly twisted and decurrent at base; lamina flat or only occasionally with incurved margins. *Inflorescences* shallowly crateriform, opening widely, 4–6 cm in diam. *Involucral receptacle* broadly convex, 1.5–2 cm in diam. *Involucral bracts* 4–5 seriate; innermost series broadly oblong, obtuse, 3.5–4 cm long, 1–1.5 cm wide, the apices concave and rounded; outer series very broadly ovate 1–2 cm long, 1–2 cm wide, apices obtuse to rounded; outer surface sparsely sericeous becoming irregularly glabrous, margins minutely fimbriate; bracts greenish-yellow, sometimes flushed with carmine. *Perianth* straight to slightly adaxially arcuate, 2.5–3 cm long, glabrous except for the lanate apices of the perianth limbs; tube 8 mm long; claws hyaline, undulate; limbs 8 mm long, linear, apices acuminate, thickly lanate with a dense white indumentum. *Style* 2.5–3 cm long, straight to slightly adaxially curved. *Pollen presenter* linear, acute, 5 mm long. *Hypogynous scales* irregularly ovate, 1 mm long.

Diagnostic Characters: The decumbent growth habit with trailing stems bearing leaves which are usually secund or subsecund (very rarely ascending) and wide, shallowly crateriform inflorescences, 4–6 cm across the mouth when open, distinguish *P. tenax* from related species.

Populations which are here assigned to *P. tenax* occur throughout the Longkloof, on the Outeniqua, Baviaanskloof, Humansdorp and Groot Winterhoek mountains. Waboomskraal in the Outeniqua range and the Cockscomb near Uitenhage, are, respectively, the extreme westerly and easterly points of its distribution range. Ecologically, the habitats of *P. tenax* may range from arid fynbos where the mean annual rainfall is about 300 mm, to fairly dense fynbos where the mean annual rainfall is about 770 mm. At all localities it is confined to soils derived from Table Mountain Sandstone. Its altitudinal range extends from 250–1 750 m. Flowering is erratic but appears to be correlated with rainfall, which, although it is spread more or less evenly throughout the year within the distribution area of *P. tenax*, tends to have a slight winter maximum. Most of the inflorescences are produced between May and September although they can appear at almost any time of the year.



FIG. 4.
Distribution ranges of *Protea tenax* (Salisb.) R.Br. and *P. foliosa* Rourke.

SPECIMENS EXAMINED

CAPE PROVINCE—3322 (Oudtshoorn): Waboomskraal near top of Outeniqua Pass (-CD), 18.7.1954, *Rycroft 1628* (NBG); Summit of old Duivels Kop Pass (-DC), 21.9.1967, *Rourke 908* (NBG).

— 3323 (Willowmore): Potjiesrivierhoogte, Uniondale (-CA), *Rourke 363* (NBG); Potjiesrivierhoogte Pass, 14.8.1960, *Acocks 21411* (PRE, NBG); 12 km S.W. of Uniondale on fynbos hills, 3.9.1951, *Acocks 16026* (PRE); Rocky hill near Haarlem (-DB), 14.3.1814; *Burchell 4977* (K); Walletjies, between Misgund and Joubertina, Longkloof (-DC), 10.7.1974, *Bayliss 6417* (NBG); Louterwater, 3.5.1933, *Compton 4211* (BOL); North slopes Tsitsikamma State Forest "The Heights", near Joubertina (-DD), 8.6.73, *Kruger 1621* (STE).

— 3324 (Steytlerville): Baviaanskloof Pass (-CB), 19.5.1971, *Stayner s.n.* (NBG 92541); Pisgoedvlakte, summit of Cambria Pass, Baviaanskloof, 13.4.1973, *Williams 1782* (NBG); About 0.5 km north of Kareedouw village (-CD), 2.5.1960, *Wurts 2081* (NBG); 3 km from National Rd., on Kareedouw Pass to Assegaai Bosch, 2.5.1960, *Wurts 2078* (NBG); Kareedouw Pass, 28.10.1961, *Rycroft 2336* (NBG); Summit of Pass north of Assegaai Bosch 25.3.1966, *Williams 721* (NBG); Baviaanskloof Mts., above Couties Kraal, N.W. of Cambria (-DA), 12.9.1973, *Oliver 4539* (STE); North slopes of Cockscomb (-DB), 7.10.1962, *L. Abel s.n.* (NBG 62889); Mac, Groot Winterhoek, 23.9.1953, *H. C. Taylor 936* (NBG); The Cockscomb, Winterhoek mts., *Archibald 3435* (PRE, GRA, NBG); The Cockscomb, 6.9.1954, *Noel 434* (GRA); Rietvlei, Humansdorp (-DC), 11.11.1941, *Esterhuysen 6623* (BOL).

— 3424 (Humansdorp): 28 km beyond Humansdorp on way to Clarkson (-AB), *C. F. Hayes s.n.* (GRA); Sandy soil on plains at Kromme River (-BA), *Niven 34* (K).

REFERENCES

- PHILLIPS, E. P. AND STAPF, O., 1912. *Flora Capensis* 5: 587 London: Lovell Reeve.
ROURKE, J. P., 1974. Notes on *Protea* in South Africa. *Jl S. Afr. Bot.* 40: 291-300.